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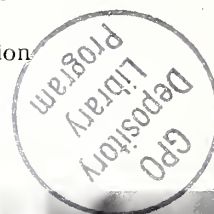
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Cover: Conservation tillage combats soil erosion while benefiting farmers economically. Cultivation with a ridge tiller can help control weeds and reduce the amount of herbicide needed. (Agricultural Research Service photo.)

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Comments from the SCS Chief:

Sustainable Agriculture Adds Alternatives

In our job as consultants to America's farmers and ranchers, the Soil Conservation Service finds an ever-growing number of conservation tools to recommend. We bring these tools to the conservation planning process, a voluntary process where our clients select the alternatives that match their goals with resource conditions.

The Food Security Act of 1985 has brought more clients than ever before through our doors, and we have addressed a greater diversity of personal resource management philosophies than ever before. Among those philosophies is one called "sustainable agriculture." This kind of agriculture has been known by many names over the years: alternative agriculture, organic farming, and even LISA, for low-input sustainable agriculture.

Of all these terms, the one that best fits is "sustainable agriculture," a term that covers a wide range of farming and ranching styles and practices. Some of these practices have been around for a long time and are familiar to many of us; many are brand new, born of the latest technology. Every day, we learn practical new ideas shared by innovative farmers and ranchers, the cooperative research community, the agrichemical and farm machinery industries, professional farm managers, and others. All of these ideas mean additional flexibility for our clients.

SCS and its conservation district partners will continue to improve the technology we recommend in the field. Our aim is to offer the widest possible choice of cost-effective and environmentally sound alternatives for soil and water conservation, with common sense, long-term profitability, and protection of America's natural resources as our basic goals.



Sustainable Agriculture

Sustainable Agriculture Offers More Alternatives

THE SOIL Conservation Service can take in stride all the talk about sustainable agriculture. After all, SCS and the Nation's soil and water conservation districts have dealt with resource sustainability for 50-plus years.

Two questions arise when the subject of sustainable agriculture comes up: What is it? What does it mean to me?

For SCS, sustainable agriculture is not a single farming method or practice. It is not a separate program. It is part of SCS's conservation planning effort. However, it expands conservation planning beyond soil erosion control and water quality improvement practices. Now included are production levels and profits matched with environmental protection.

Simply stated, sustainable agriculture means offering the farmer or rancher more alternatives during the planning process.

It may help to think of sustainable agriculture in terms of **means** and **ends**. Ends are where SCS, as an agency, wants to go to help make agriculture sustainable; means are what SCS wants to do to achieve these ends.



"Painted" against a backdrop of contour strips, a combine makes its way through a row of corn in Green County, Wisc. (Photo by Ron Nichols.)

To be successful, sustainable agriculture must have three goals:

- To be both productive and profitable for producers in the long run;
- To reduce potential environmental risks and conserve soil, water, and other natural resources; and
- To assure an abundant, safe, high-quality food supply at reasonable cost to the consumer.

The **means** to achieve sustainable agriculture begin with skillful farm and ranch management. Every producer is different, every farm or ranch is different, and every farming situation is different. There is no one answer.

A skillful manager's considerations include crop variety selection and diversification, integrated pest management, and nutrient management as well as soil and water conservation management programs.

Successful sustainable agriculture involves a sound knowledge of crop growth to keep costs down, to hold pest populations below economically damaging thresholds, to use agrichemicals prudently, and to optimize profits.

Secretary of Agriculture Clayton Yeutter, in a recent issue of the *Journal of Soil and Water Conservation*, said that while...[sustainable agriculture]...is a concept full of

In sustainable agriculture the concepts remain but the technology changes.

promise, its success depends on the individual producers and where they are located.

"...we need to carefully evaluate our soils and technology by geographic areas and locations to best use this alternate agriculture production system," Yeutter said. "That means careful consideration of related factors, such as manure and other organic material supplies, markets, and other considerations that influence the viability of low-input, sustainable agriculture."

What does the Secretary mean by "low-input"? It doesn't mean no-input; typically, it means a reduced use of "purchased" inputs, such as pesticides and chemicals. Low-input could better be described as "substituted inputs." If purchased inputs are decreased, other nonpurchased inputs, mainly management and to a lesser degree, labor, are increased. The choice of the type of input is the land user's decision.

The origins of sustainable agriculture in USDA began in March 1987 when former Assistant Secretary Orville Bentley established a task force to examine alternative agriculture—as it was called back then. Committee work followed. In January 1988, then Secretary of Agriculture Richard Lyng issued a policy statement which encouraged:

- Support for research and education programs in alternative agriculture;
- Official recognition of alternative agriculture, which would give it credibility within the research community;

- Recognition of the potential of alternative agriculture for positive effects on income and the environment; and

- Recognition of the need for producers to make choices.

Across the country, university research personnel, farmers and ranchers, and even the agrichemical industry were curious about the idea of sustainable agriculture. Some farmers and ranchers did more than think about it; they became actively involved in field-level research.

Preliminary findings in field trials by farmers and ranchers showed that their crop yields were slightly lower but their net returns were higher through sustainable agriculture, compared to results achieved with the more conventional systems they previously used.

Increased net returns in sustainable agriculture can be achieved by optimizing the agricultural operation through:

- Increasing its efficiency;
- Reducing or substituting inputs;
- Carefully fine-tuning fertility programs;
- Using integrated pest management systems; and
- Taking a more hands-on approach toward management.

But additional research is needed to more fully determine what it is going to take to develop, manage, and survive on a sustainable agriculture operation.

In sustainable agriculture the concepts remain but the technology changes. For example, SCS personnel follow the concepts and principles of biology, soil chemistry, physics, erosion, and water

management every day. Newer technologies, such as biotechnology, genetic engineering, and integrated pest management have been recent additions to the agricultural scene.

SCS is using these newer technologies as they upgrade the Field Office Technical Guides to incorporate how water quality is affected by conservation, nutrient management, plant materials, and pest management practices used in sustainable agriculture. Many practice standards are being revised in these areas.

The agency continues to monitor research on sustainable agriculture. Scientists are examining new conservation tillage alternatives, such as the no-till cotton being evaluated in Mississippi. SCS is taking a fresh look at bench terraces, especially those that can be established vegetatively.

Its engineers are looking at low-initial-cost conservation practices to vary the design latitude of conservation practices, thereby providing more flexibility to the producer.

SCS and the soil and water conservation districts are extending their thinking, concerns, and assistance to sustainable agriculture. Now SCS'ers have the opportunity to help interested producers understand more fully what sustainable agriculture is, how it works, and what choices producers have to become skillful managers of sustainability on their own farms and ranches.

Marc Safley, assistant director, ecological sciences, SCS, Washington, D.C.

Farmers save from the more efficient use of crop production inputs that Deibel promotes.

New Team On The Scene In Agriculture

THE CONSERVATION team of the 1990's will have a new look. A growing number of consultants from private-sector agencies will be providing farmers with information and technology needed to achieve sustainable agriculture for the future.

Many farmers will be installing conservation practices on their own. As in the past, the Agricultural Stabilization and Conservation Service (ASCS), Extension Service (ES), Soil Conservation Service, and soil and water conservation districts (SWCD) will be on hand to help them.

When John Deibel talks, dairy farmers in western New York listen. Deibel is the managing consultant for the Western New York Crop Management Association (CMA), a grower-owned nonprofit cooperative that is the first of its kind in New York.

The association is run by an elected board of directors who help farmers manage crop production inputs, such as fertilizer and pesticides, more efficiently. Farmers can increase farm profits through better crop management while reducing potentially harmful

effects on the environment. Currently there are 117 farms covering 32,000 acres in the association.

The CMA works closely with SCS, ES, ASCS, and land-grant universities to provide research-based information to farmers. Every year between December and March, the CMA provides each grower with recommendations that cover all aspects of crop management. These recommendations are based on current soil tests and manure analysis when appropriate.

Deibel says that the recommendations range from establishing crop rotations to participating in Government cost-sharing programs for seedlings. Having the recommendations well in advance allows farmers to shop around for the best buys in seed, chemicals, and other supplies. It also helps farmers get started on cropping sequences that may be called for in their conservation plans.

Why do farmers join? According to Deibel, the main reason is time. They have the expertise to manage their crops but need to spend their time on other tasks such as managing livestock. CMA also helps farmers keep up with current information and technology. Farmers know they can get information needed on the same day it is requested.

Farmers save from the more efficient use of crop production inputs that Deibel promotes. Farmers particularly appreciate the need to protect soil and water resources—because their livelihood depends on it. Dairy farmers have long been concerned about the impacts of nitrates on ground water because their families and cows

consume water from onfarm sources. But they also recognize the need to farm economically if they are to stay in business.

As a former Extension agent, Deibel knows that good research contributes to best management practices (BMP's); and CMA showed such benefits through a demonstration project that compared these practices.

With a sustainable agriculture grant in hand, CMA held the project on six CMA demonstration farms and showed the economic and environmental impacts of using BMP's to grow crops more efficiently.

The project had two purposes: first, to show practices that can reduce crop inputs like fertilizers and pesticides; and second, to explore whether the use of integrated crop management can lead to greater profits, as CMA members believe.

Meetings were also held to educate farmers on the use of BMP's, and a publication summarizing the results was distributed to 2,500 farms in the western New York region.

Willard and Calvin DeGolyer of Table Rock Farm, Inc., in Castile, N.Y., participated in the project. They grow 630 acres of corn, hay, and small grain to feed 430 dairy cows.

The DeGolyers have had a conservation plan for the Table Rock Farm since 1978. They entered into a long-term agreement with the Wyoming County SWCD and with ASCS in 1985. With help from Robert Hartrick, SCS district conservationist, they installed a re-

...more research is being done by Cornell University to assess the nutrient value of cover crops for subsequent corn production.

source management system that included contour stripcropping and tile outlet diversions.

W. DeGolyer said, "We try to get the most out of whatever we have, whether it's land or machinery. Our farm is really a 'production machine,' and our land is an important part of that machine. Anything we do has to pay for itself.

"The project demonstrates the value of cover crops in rotations as a source of nitrogen for corn production. That's why we agreed to participate."

The DeGolyers used three methods to establish winter rye in the corn silage: seeding rye after the corn harvest and harrowing it in; seeding rye as a cover crop before corn cultivation; and seeding rye after corn cultivation.

Rye was harvested (tops and roots) in spring 1989. Results showed that the best time to plant winter rye is at cultivation time—when corn is 8 to 16 inches high. When rye was seeded prior to the corn harvest, the rye produced greater total dry matter than when planted after the harvest.

According to C. DeGolyer, "Putting the rye on before cultivation eliminates extra harrowing. This saves tractor hours, fuel, and labor—unnecessary costs."

A comparison of nitrate levels showed a slight increase in the amount of free nitrogen in the soil following the use of a cover crop. As a followup to the project, Cornell University is doing more research to assess the nutrient value of cover crops for subsequent corn production.



Lori Ludwig, program assistant, and John Deibel, management consultant for the Western New York Crop Management Association, develop recommendations for growers that cover all aspects of crop management. (Photo by John Whitney.)

Other reduced input strategies were tried on five other farms. These included evaluating insecticides for corn rootworm control, making soil-test recommendations for alfalfa, evaluating the economics of "banding" herbicides in corn, comparing grass stands versus legume mixtures, and trying various soil-conditioning products in corn.

"They showed a need for more intensive monitoring and more timely application of chemicals," said Deibel. "Don't look for miracle products. Do a better job with good management practices at home. It's the human resource that is critical, not the input. The important thing is to start with a soil test and appropriate crop rotation. That's the basis for the other

decisions on varieties of species, chemicals to use or not use, pH, and other inputs."

CMA members cut nitrogen inputs in half from 1986 to 1987 by using sensible rotations, giving proper credit to onfarm manures, and using BMP's. CMA consultants conducted "scouting" programs to monitor weed growth and insect populations in fields throughout the year. They suggested when pesticides were needed.

Through these efforts, growers eliminated unnecessary pesticides in corn, saving an average of \$6 per acre across the farms studied.

Pat Paul, public affairs specialist, SCS, Syracuse, N.Y.

Having suitable computer equipment and software packages further assists the planner in helping the land user make informed decisions.

SCS'ers Are CAREing and Comparing

AMONG NEW computer information and calculation tools that the Soil Conservation Service has prepared as part of its sustainable agriculture program are CARE, Compare, and Quick Budget.

The Cost and Return Estimator (CARE) helps land users analyze alternatives that SCS conservation planners prepare to meet land-user needs, problems, and concerns.

Typically, any alternative the land user chooses would change his or her present operation and the farming or ranching methods used. CARE generates cost and return data for the present versus suggested systems.

CARE relies on data bases that store farm activity information. There is enough flexibility in this tool to consider variations in own-

ership, usage patterns, and machinery.

The Quick Budget option of CARE is ideal for SCS field offices. Assuming basic cost and return information is already available through the State office, the conservation planner analyzes particular crop enterprises by using "base" budgets as starting points. The planner then customizes the cost and return data using Quick Budget.

An automatic recalculation feature of Quick Budget is useful for "what if" analyses. Any new cost figure added, deleted, or changed results in a recalculated total budget that is displayed instantly.

A bar at the bottom part of the screen shows total revenue, total costs, and net returns. Internal budget changes automatically adjust the bottom line.

An option called Compare is being added to the Quick Budget to specifically address sustainable agriculture comparisons. Compare allows users to select two budgets to compare in the same report. This helps planners show simultaneously the alternatives that the

land user may wish to choose between.

The conservation planner can provide a variety of suggested alternatives to land users considering alternative agricultural techniques. Having suitable computer equipment and software packages further assists the planner in helping the land user make informed decisions.

CARE can be used with computer software currently in use at most SCS field offices. It operates equally well in the Unix and MSDOS systems with a spreadsheet-like user interface and complete context-sensitive, "pop-up" help facilities.

CARE helps users share budget data. The data is stored in the ASCII format to aid in transmitting the data to other software packages. A future enhancement to CARE will include detailed irrigation analyses—an asset for planning in dryland and irrigated regions.

All automated SCS field offices have or can obtain CARE. State offices continue to load regional base budgets onto the field's system for use in Quick Budget.

SCS planners use the Quick Budget when customizing cost and return data that will help land users reap the benefits of sustainable agriculture.

Sustainable agriculture means different things to different people, but most agree that it always involves change. With its CARE, Compare, and Quick Budget, SCS is taking some of the risk out of that change for farmers and ranchers.

Douglas A. Christensen, agricultural economist and staff head, Midwest National Technical Center, SCS, Lincoln, Neb.



What are they looking at? CARE, that's what. Doug Christensen, SCS economist at the Midwest National Technical Center in Lincoln, Neb., and Constance Miller, SCS State economist for Nebraska, discuss improvements planned for Cost and Return Estimator (CARE) units for field offices. (SCS photo.)

The Center is dedicated to keeping some of the oldest food crops in the Western Hemisphere from disappearing from the face of the earth.

Ancient Seeds Reappear

IN MANY INDIGENOUS cultures, one of the most important customs is passing down agricultural traditions from generation to generation. Items like seeds and agricultural knowledge have been treasured and help the culture survive.

In San Cristobal, N. Mex., the Soil Conservation Service is creating a conservation plan for a new nonprofit organization, The Sustainable Native Agriculture Center (SNAC). The Center is dedicated to keeping some of the oldest food crops in the Western Hemisphere from disappearing from the face of the Earth.

SNAC is located on 146 acres owned by the Waterbird Institute, an organization that promotes education in the arts and sciences. It is leasing from the institute 12 acres of land with a water right and a facility to test crops under irrigated conditions.

The Center was formed to address the problems of local farmers trying to earn a living on small farms with limited resources. The farmers are further limited by poor

soils and a short, dry, growing season in a mountainous region of the State.

John Kimmey, director of SNAC, began collecting garden seeds several years ago. The seeds had been handed down through the generations. Many were still being grown in family gardens.

As Kimmey collected the seeds, he asked the village elders how to grow the seeds and recorded that information. The age-old growing techniques, handed down from farmer to farmer for centuries, have contributed heavily to SNAC's success.

Within a couple of years, Kimmey had collected seeds of nearly 400 different ancient varieties and species of food and herb plants. They all grew well despite poor soil, elevations of 6,000 to 8,000 feet, a short growing season of 80 to 120 days, and periods of drought.

The Center entered the global arena when they discovered that problems they were attempting to surmount also existed in most Third World countries. Shortly after Kimmey became director of the Center, he became affiliated with Bolivia's University of Cochabamba, which had over 700 varieties of food crops and herbs obtained from small villages throughout the highlands of South America. The Center determined through a testing program that crops they develop will have a wide area of adaptability.

The 16th century Spanish conquest destroyed many staple food crops of South America. But remnant crops still existed in small, isolated areas where they were, and still are, locally important staples. Two "found" crops, quinoa and amaranth, that appear to have great promise for the world were rediscovered in South America.



Specialty seeds found at the Sustainable Native Agriculture Center can fill a need in new agricultural markets. Anasazi beans are sought for their link to an ancient people who once lived in North America and whose disappearance remains a mystery. (Photo by Jo Schilling.)

Tobacco farmers in the Piedmont have long appreciated the benefits garnered through adding organic matter in a sod-based rotation.

Quinoa was the "Mother Grain" of the Incas. It is not a true grain but the seed of a wild spinach. These varieties are higher in quality protein (with large amounts of several essential amino acids, including the rare lysine) than any standard commercial grains. Quinoa is also very high in phosphorus, calcium, iron, vitamin E, and several of the B-complex vitamins.

Quinoa grows well in a variety of conditions. Even in poor soil with low rainfall, it produces as much as 1,400 to 1,700 pounds per acre. With optimum soil conditions and adequate moisture, 4,000 pounds per acre is not uncommon. The Center is producing yields of about 3,000 pounds per acre.

Amaranth was the religious ceremonial grain and one of the major food crops of the Aztecs of Mexico. This member of the pigweed family is widely adaptable and can substitute for corn and rice. Usually used as a flour, it can also be cooked like rice.

Other crops appearing to have promise in the United States include blue corn and many valuable bean varieties. Some varieties of blue corn, indigenous to northern Arizona, are extremely drought-tolerant, producing dryland crops on only 4 inches of annual rainfall.

The Center has sent 22 varieties of corn, bean, and quinoa seed to India for testing. Seed has also been sent to China and Mexico.

The Center is directly involved in research in Zaire, Egypt, Switzerland, and Kuwait. It plans to offer 2-week summer sessions on methods for growing these ancient seeds.

SNAC plans to train local producers and contract with them for bulk seed. The business should prove profitable for these farmers.

Additional information about the Center is available from The Sustainable Native Agriculture Center, P. O. Box 360, Arroyo Hondo, NM 87513.

William W. Fuller, plant materials specialist, SCS, Albuquerque, N.M.

Sustainable Agriculture Works in Piedmont

FARMERS WHO practice conservation on their operations in the Piedmont section of North Carolina have long benefited from sustainable agriculture activities.

The Department of Agriculture and the Soil Conservation Service define sustainable agriculture as optimizing skills and technologies to achieve long-term stability of

the agricultural enterprise, to achieve environmental protection, and to achieve consumer safety. Farmers have long called it common sense.

SCS guidance and advice on appropriate soil and water conservation practices are an excellent beginning to any sustainable agriculture enterprise. Sustainable agriculture not only protects the environment, but it can help produce crops more cheaply.

In the Piedmont, usable water limits the crop yield. Despite adequate rainfall during most of the growing season, surface runoff and the resulting soil erosion due to water cut sharply into the crop yield—unless a conservation tillage practice is used, such as no-till or stripcropping.

Tobacco farmers in the Piedmont have long appreciated the

benefits garnered through adding organic matter in a sod-based rotation.

In Alamance County, N.C., farmer Jimmy Roney saved one field irrigation per year by including a year of fescue in his tobacco rotation. Conservation rotations also helped combat pest and disease problems.

The Department's sustainable agriculture program is more than just soil and water conservation. It reduces fertilizer needs, saves moisture, reduces irrigation needs, and prevents disease problems. All these items help keep the farmer profitable.

James H. Canterbury, State resource conservationist, SCS, Raleigh, N.C.

Their objective was to reduce chemical usage and control weeds, yet achieve desired yields.

Farmers Cultivate For Water Quality

A PILOT demonstration project helped several Litchfield County, Conn., farmers achieve their yield goals while using a traditional method to control weeds.

In the project, several farmers stopped using herbicides and began using cultivators to control weeds in some of their field corn. Their objective was to reduce chemical usage and control weeds, yet achieve desired yields.

David Jacquier, a dairy farmer from East Canaan, Conn., cultivated 10 acres of field corn silage in demonstration plots. He used a cultivator rented for him by the Litchfield County Soil and Water Conservation District for the demonstration project.

"Several of the plots were next to conventionally managed corn. It was difficult to tell the difference except in wet areas, where the crabgrass got hold, and along the field edges, where there were more weeds because of the lack of shade," said Jacquier.

Spring 1989 produced the worst possible weather conditions



Bob Loomis, a Connecticut farmer, likes to use a cultivator because it reduces production costs and obtains desired yields. (Photo by Geri Nebor.)

in which to cultivate. Wet fields delayed field operations and provided favorable conditions for rapid weed growth.

Despite the mixed results, many farmers like Bob Loomis, farm manager for the Connecticut Junior Republic (a boarding school for troubled youths), plan to use the cultivator again next year because it reduces production costs and obtains desired yields in good weather.

Loomis used a 30-year-old cultivator to cultivate 24 acres of sweet corn. "The theory of cultivating is to never look back. It would frighten you to death because it looks awful," said Loomis.

While concerned about soil erosion on highly erodible land,

farmers in Connecticut are also concerned about affecting water quality. They protect farmland from soil erosion by farming on the contour, by crop rotations, and by stripcropping. They use cover crops to provide residue to protect soil during the winter.

The favorable results from the demonstration showed that cultivating crops to reduce herbicide use, thereby protecting water quality, is feasible.

Geri Nebor, district manager, Soil and Water Conservation District, Litchfield, Conn. and **Philip Morneault**, public affairs specialist, SCS, Storrs, Conn.

The Collins' innovative ideas and willingness to experiment and share the results helped their farm be recognized as one of the top 10 farms in the Nation.

Getting Help For Water Quality

CONCERN ABOUT the potential for ground-water contamination led to the start of a 'second LISA,' said John "Jack" Collins. He and his wife, Mavis, operate the Powder Hill Farm in Enfield, Conn.

In this case "LISA" is the term used for low-input sustainable agriculture, an alternative farming system. The Collins' "first LISA" was their daughter, born 18 years ago.

The discovery of the soil insecticide ethylene dibromide in ground water in a neighboring town started Collins thinking about the near and distant future. He turned for advice to the U.S. Department of Agriculture's Extension Service and Soil Conservation Service.

Walt Washko, former Cooperative Extension System agronomist, suggested eliminating the use of this insecticide on corn fields. The objective was to reduce crop production costs, thereby improving the farm's sustainability, while reducing the risk of chemicals being leached into the ground water.

"We eliminated not only the soil insecticide but also herbicides, saving \$5,000 in production costs without affecting yields," said Collins. Similar results with sustainable agriculture occurred the next year.



John "Jack" Collins explains the use of a cultivator to farmers at a sustainable agriculture demonstration project in Connecticut. (Photo by Philip Morneault.)

Collins, the Hartford County Soil and Water Conservation District chairperson, discussed his experiments with other district officials and SCS people in Connecticut. When he spoke with Philip Christensen, former Connecticut SCS State conservationist, the enthusiastic response Collins received led him to help organize the Connecticut Association of Conservation Districts sustainable agriculture effort.

Farmers in Connecticut enthusiastically volunteered to use their land as demonstration farms and to try out a variety of techniques.

"The goal of the sustainable agriculture effort is to utilize fertilizers, chemicals, and manures efficiently and effectively through the use of soil testing, innovative crop management techniques, and integrated pest management," said Collins.

In June 1989 the University of Connecticut's Cooperative Extension

System conducted a nitrate-testing program. "What we found was that 'preplant' nitrogen application is useless," said Collins. "We need to fertilize when the plant can utilize the nutrients."

The Collins' innovative ideas and willingness to experiment and share the results helped their farm be recognized as one of the top 10 farms in the Nation. The farming operation was nominated for the National Endowment for Soil and Water Conservation's Outstanding Conservation Farmer/Rancher Award in 1989.

"I knew 'LISA' would be more than a passing fancy," said Collins. "That's why I became involved in promoting sustainable agriculture."

Philip Morneault, public affairs specialist, SCS, Storrs, Conn.

The cultural methods are ancient, but a few modern techniques will blend well with frugal concepts from the past.

Navajos Grow Corn As Their Elders Did

GROWING CORN successfully on stark, sheer mountainsides with only 8 sporadic inches of rainfall and snowmelt gives low-input a whole new meaning.

That's what the Navajo Indian families do in the Black Mesa mountain range on their reservation near Kayenta, Ariz.

The ages-old technique of gathering runoff water from the rocks and spreading it on the sandy soil is used here—a unique example of sustainable agriculture.

The Soil Conservation Service is assisting the Navajos in more efficient use of the precious water

for irrigation. Jerry Gilmore, district conservationist from Kayenta, is here today to check conditions and offer irrigation ideas.

As he enters the Black Mesa, mountains begin at his feet. Bed-rock simply shoots skyward out of level sand at a steep angle for 1,000 feet or more. Moving clouds make the rock mountains appear as if they are soaring.

"This can't be farmland," Gilmore muses. Yet, the crops are there...corn, squash, and melons; even apple and peach trees.

"The Ancient Ones," the Anasazi, harvested these same fields almost 1,000 years ago. Pictographs on rocks and corncobs among ruins are the evidence. And the Navajos still do it today.

They built low curbs along the bottom of the rock slope to direct water to a central point where it runs into earth ditches that carry the water to small plots containing plants. This technique concentrates runoff from a large area onto a few acres, thereby increasing the amount of water.

"A little land leveling here...some improved ditches there...and do some soil moisture monitoring," Gilmore suggests. "You can farm more acres with the same amount of water."

These Navajos plant in 1-foot-deep holes. Inputs are very low.

First, there's a shovel of manure in the hole to fertilize several plants in one spot. Next, some topsoil. A few purple Indian corn kernels follow or bean, squash, or melon seeds from last year. Six inches of topsoil fills the hole. Time plus rain and melting snow will do the rest.

Returns are meager compared to modern standards. Good years and bad years are magnified in one's mind, but they average into "that which is enough" for the people.

There is no waste; everything is put to good use. Leftover herbage is given to the sheep or horses.

The Indians have selected drought-tolerant crops through a thousand years of trials. Cultural methods are ancient, but a few modern techniques will blend well with frugal concepts from the past.

As Gilmore leaves this oasis in the high desert, he says he can feel the promise of next year's crop lying idle in the sky.

Dave Seery, area biologist, SCS, Flagstaff, Ariz.



During the growing season, "curbs" built at the bottom of slopes funnel precipitation into small delivery ditches for irrigation use on corn, melon, and squash plots (beyond fence). (SCS photo.)

"We are excited about the opportunity to reach the more urban audience that the building attracts."

Exhibit Opens In Iowa

"DRUM ROLL, PLEASE." "The scissors..." Snip! The ceremonial tape was cut. After 3 years of planning, coordinating, and construction, the Delicate Balance was open.

The Delicate Balance, an exhibit of human values and Iowa's natural resources, made its debut amid fanfare in December 1989 at the State Historical Building. The Soil Conservation Service in Iowa was among those celebrating the opening because they contributed to the soil conservation section of the Delicate Balance.

"Over 300,000 people visited Des Moines' Historical Building last year," said J. Michael Nethery, Iowa State conservationist. "We are excited about the opportunity to reach the more urban audience that the building attracts."

The soil conservation section of the exhibit shows the story of conservation past, present, and future. By turning a wheel, visitors can see how the depth of topsoil decreased due to erosion from the 1800's to the end of the 20th century—erosion through history.

A closeup of a raindrop splashing on bare ground shows how water starts soil erosion. Pictures of contouring, grassed waterways, stripcropping, and terraces high-



Bill Johnson, curator, inspects the Soil Conservation Service portion of the Delicate Balance exhibit recently opened in Des Moines, Iowa. (Photo by Colleen Weinzetl.)

light farmers' efforts to stop erosion. Then visitors can view a 3-minute videotape on soil and water conservation.

Soil conservation is surrounded by many other exhibit sections that cover resource issues from coal mining to wetlands and from prairie grasses to water quality. Some sections use beauty to get their point across; others use satire. All are informative.

"The exhibit was developed to educate people," Nethery said. "We wanted to show visitors why soil erosion is important from a historical perspective, but also show how farmers are saving soil."

Colleen Weinzetl, public affairs specialist,
SCS, Des Moines, Iowa

Task Force Reports on Rural Programs

The U.S. Department of Agriculture's Rural Revitalization Task Force has presented its recommendations to Secretary of Agriculture Clayton Yeutter.

The task force report, "A Hard Look at USDA's Rural Development Programs," makes 17 specific recommendations for enhancing the effectiveness of USDA's rural development efforts. Recommendations included:

- Preparation of an inventory of all Federal programs that affect rural America, with particular attention to economic development and revitalization;
- Development of a matrix of "compatible" programs that complement each other, identification of programs that represent a duplication of effort, and preparation of recommendations on how to achieve greater efficiency and effectiveness from the limited available resources; and
- Recommendation of a "management plan" that will provide a basis for directing and coordinating the "Plan of Action" on a day-to-day basis.

Under Secretary for Small Community and Rural Development Roland Vautour will oversee specific implementation proposals based on the recommendations.

The task force was appointed in February 1989 to examine USDA's rural development resources and programs and to make recommendations for improvement. The report, "A Hard Look at USDA's Rural Development Programs," is available from the office of the Under Secretary for Small

Community and Rural Development, Room 219-A, Administration Building, USDA, Washington, DC 20250; telephone (202) 447-4581.

Plant Materials Conference Looks to 1990's

"Advancing Plant Materials Technology in the 1990's" was the theme of a national conference held in Baton Rouge, La., in January.

Keynoter Robert R. Shaw, Soil Conservation Service deputy chief for technology, set the tone by advising "to survive is to change." He emphasized that SCS priorities are changing and all SCS employees share a need to respond to the changes.

Prominent on the list of symposium topics was the role of plant materials in protecting and improving water quality. Keith Bounds, research scientist at the Stennis Space Center in Mississippi, discussed the use of wetlands to clean municipal and agricultural waste water, including backyard or even indoor wetlands to purify septic tank effluent.

University of Rhode Island professor Michael Sullivan spoke on the use of plant materials for filter strips along sloping agricultural fields to trap sediment and chemicals before they can degrade water courses.

John Burt, SCS environmental coordinator, challenged Plant Materials Centers to assemble and publish current knowledge on the use of cover crops to control erosion from cash crops and to accelerate the development of more information.

Sustainable agriculture was the subject of a presentation by Wes

Jackson of The Land Institute, Salina, Kans. Also speaking on the topic was Ronda Janke, research agronomist with the Rodale Research Center, Kutztown, Pa. She presented Rodale's comparison of crop rotations receiving high-, medium-, and low-chemical inputs.

Several speakers covered the control of noxious weeds, for the benefit of plant materials personnel in the Western United States.

A field trip to the Louisiana State University Rice Research Center in Crowley, La., showed attendees a success story in tissue culture on smooth cordgrass, which is being used to restore coastal marshes in Louisiana.

By conference end, participants felt they had the answer to the question posed at the opening session: Can and should the plant materials program significantly advance its technical capability in the 1990's? Their response: a resounding yes.

Curtis Sharp, national plant materials specialist, SCS, Washington, D.C.

Information Center Covers Sustainable Agriculture

The Alternative Farming Systems Information Center (AFSIC) at the U.S. Department of Agriculture's National Agricultural Library (NAL) in Beltsville, Md., has received a boost from the expanding interest nationwide in sustainable agriculture.

The Center was initiated in response to the 1985 Farm Bill,

which emphasized collection and dissemination of information on sustainable agriculture and low-input farming systems to farmers and others.

By the time the U.S. Department of Agriculture's (USDA) low-input, sustainable agriculture program began 2 years ago, the AFSIC had produced a large body of information products and had acquired an audience of users who had received assistance.

The AFSIC is supported by NAL and by USDA's sustainable agriculture grants. Among the services it offers are assistance in accessing NAL's extensive collections on a broad range of agricultural subjects; referral to organizations or experts in the field who can provide additional information; identifying current research conducted by USDA research agencies; furnishing bibliographies; and performing brief, complimentary searches of the AGRICOLA data base on specific topics.

For more information, write AFSIC, National Agricultural Library, Room 304, 10301 Baltimore Blvd., Beltsville, MD 20705, or telephone (301) 344-3704.

Water Quality Assistance Provided

More than \$17 million will be provided by the U.S. Department of Agriculture (USDA) this year to help 37 States improve water quality in identified agricultural watershed areas.

Water quality improvements will be implemented cooperatively by USDA's Agricultural Stabilization and Conservation Service

(ASCS), Extension Service (ES), and Soil Conservation Service.

Improvements are part of the Department's accelerated water quality effort for the 1990's and support the President's 1990 Water Quality Initiative. In 1991 it is anticipated that another 37 hydrologic unit areas will be identified.

Criteria considered in selecting areas include: agriculture-related problems, surface and ground water effects, and feasibility of treatment.

Hydrologic unit areas were selected by the Education and Technical Assistance Committee of USDA's Water Quality Working Group. The committee includes representatives from eight USDA agencies, as well as the Environmental Protection Agency (EPA), the National Oceanic and Atmospheric Administration, and the U.S. Geological Survey (USGS).

USDA plans to work closely with the EPA, USGS, and State and local agencies on all the projects to solve identified and prioritized problems.

ASCS plans to provide \$7 million in cost-share assistance for water quality improvements, including practices such as animal waste-control facilities, sod waterways, water management systems, and integrated crop management systems.

ES plans to provide over \$4.5 million in education assistance, including recommendations for specific usage of nutrients and pesticides.

SCS plans to provide nearly \$5.4 million in technical assistance, including direct support for increased SCS and conservation district staffing.

The Economic Research Service plans to provide \$150,000 in staff support to evaluate the cost-effectiveness of alternative management practices.

Louis Bromfield at Malabar

Edited by Charles E. Little

Today, few read—or can even name—his novels, including the one that won a Pulitzer Prize in 1928. But many have heard of writer Louis Bromfield's conservation farm near Mansfield, Ohio, known as Malabar Farm.

In 1939, Bromfield returned to the United States after many years of living in Europe. He decided to use the money he had earned with best selling novels and movie scripts to restore to productivity some of the 1,000 acres of land he purchased near his family's former property.

Over the course of the next dozen years he wrote four books about the farm, at the time the most famous experimental farm in the country. In this volume, published in 1988, Charles E. Little has excerpted chapters to give an overview of Bromfield's philosophy and his experiences as a farmer.

He believed strongly in the ideals of Thomas Jefferson and that traditional rural values could be reconciled with modern, industrialized agriculture. He was a friend and supporter of Hugh Hammond Bennett, first head of the Soil Conservation Service.

Bromfield was an early advocate of sustainable agriculture and self-sufficiency. His observations are still pertinent today.

Copies are available from Customer Service, The Johns Hopkins University Press, 701 West 40th Street, Baltimore, MD 21211, priced at \$21.20, postpaid.

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Conservation Calendar

June	2-4	World Pork Expo, Des Moines, Iowa
	3-5	National Ag in the Classroom Conference, Washington, D.C.
	6-8	Rice Millers' Association Convention, Orlando, Fla.
	16-19	National Rally, 1990: "Strength through Diversity," The Land Trust Exchange, Villanova, Pa.
	17-20	International Apple Institute Convention, Nashville, Tenn.
	17-20	Grocery Manufacturers of America Convention, White Sulphur Springs, W. Va.
	19-21	Corn Utilization Conference III, St. Louis, Mo.
	24-27	American Society of Agricultural Engineers International Summer Meeting, Columbus, Ohio
	25-29	American Seed Trade Association Convention, Orlando, Fla.
	26-29	History of 1890 Land-Grant Colleges and Universities Centennial Symposium, Tallahassee, Fla.
July	12	Ag Tech '90, Blacksburg, Va.
	12-14	Izaak Walton League of America National Convention, Syracuse, N.Y.
	14-17	International Agricultural Communicators in Education (ACE) Meeting, Minneapolis-St. Paul, Minn.
	27-30	American Soybean Association Convention, Milwaukee, Wis.
	29-Aug. 1	Soil and Water Conservation Society Annual Meeting, Salt Lake City, Utah
	30-Aug. 2	62nd National Institute on Cooperative Education, St. Paul, Minn.
August	3-5	"Organic Agriculture: Sowing the Seeds for a New Decade," Natural Organic Farmers Association, Amherst, Mass.
	5-11	XIX International Union of Forestry Research Organizations World Congress, Montreal, Canada
	7-9	National Agricultural Research and Extension Users Advisory Board Meeting, Blacksburg, Va.
	12-15	CONSERV 90, The National Conference and Exposition, Phoenix, Ariz.